Evidence Measure Review No.8
Parking
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Measure No.8: Parking

Use of parking policy and parking management as a tool to influence and manage car traffic in and around urban areas.

As most car trips end up in a parking space there is an opportunity to use parking policies that control availability and price in a city to have an effect on managing (car) travel demand.

Key messages:

- Evidence is unanimous on the importance of parking to manage car travel demand in urban areas, with parking issues strongly influencing the decision-making process for travellers.
- Parking management schemes do not usually require large investment (compared with public transport infrastructure), and can be realized in a relatively short time.
- Restrictive parking policy measures (i.e. parking pricing) are not seen to have detrimental effects on the local (retail) economy.
- Effective parking management can actually increase the attractiveness of a city centre and its economic vitality.
- Parking policies can contribute to reducing car commuting. Giving commuters the choice between free parking or its equivalent cash value (‘parking cash-out’ policies) have proved to be very effective in reducing car commuting.
- Parking management, and increasingly technology-based ‘smart-parking systems’, can reduce search time, or ‘cruising’ by drivers looking for parking spaces. This can bring significant benefits in fuel use, air quality and congestion.

8.1 Context and background

Since the 1990s parking policies have increasingly been used as a tool to manage car traffic in and around urban areas in Europe.

Potential interventions

- Traditional parking management controls (pricing / availability of spaces)
- Smart Parking systems.
- On-street parking sensors
- Real-time parking availability and pricing information
- Workplace parking charges

Parking is normally managed at a local level, meaning that local authorities or city administrations make policy regarding parking. Usually a municipal parking policy has four
main aims (Mingardo et al, 2014):
1. To contribute to a better accessibility and mobility of the urban area;
2. To contribute to a better quality of life in the city (mainly a better air quality and quality of the living environment);
3. To support the local economy.
4. To raise municipal revenue.

Compared to other local transport policies parking management has two clear advantages (Mingardo et al, 2015; P&P, 2015, Litman, 2006):

- Parking management interventions do not usually require large scale investments, as might the provision of extra public transport services, and it can be realized in a relative short time;
- Some form of parking management is already deployed in most of cities and towns; this makes the societal acceptability of parking easier than for example the introduction of a congestion charge scheme;

### 8.2 Extent and Sources of Evidence

The reports and papers considered for this measure review refer to a variety of parking policy measures in different cities within and outside Europe. While some of the papers (Shoup, 2005; Litman, 2006; Mingardo et al, 2015) describe the parking policies in general, most of them focus on specific case studies and/or projects (among others: Hagelin and Perone, 2004; Fabusuyi et al, 2013; Guo, 2013; Rye et al, 2006). Most of the papers and articles are peer reviewed and they have all been written in the last 15 years. In total 25 papers and reports have been analysed for this measure review.

Some of the paper presents quantitative evidence of the effects of parking policies. None of the paper includes a complete cost-benefit analysis, but some paper do report on costs or benefits related to the implemented measure. These data could be used to perform a CBA on parking related policies.

### 8.3 What the Evidence Claims

#### 8.3.1 General remarks

The papers and reports mainly describe ex-post analyses of parking policies, projects involving parking or the effect of specific parking measures on traffic and mode shift. Most of the times they include a case study and/or data analysis. There are no papers discussing theoretical models and/or simulations, so almost all the item reviewed are based on a on a specific scheme or intervention.

The majority of the reports and papers make use of data on modal split, parking search traffic, occupancy ratios, car ownership, vehicle miles travelled and related carbon emissions. The rest of this section presents an overview of the evidence that has been reported in the papers analysed.

#### 8.3.2 Reduction in search traffic

One of the major negative externalities caused by inadequate parking management is search traffic or cruising for parking – i.e., when people drive around in search for an available parking space. Cruising leads to not only additional extra pollution, noise and accidents but it also increase the costs for drivers – i.e. extra time and fuel. According to Shoup (2007), “A surprised amount of traffic isn’t caused by people who are on their way somewhere. Rather it
is caused by people who have already arrived”. The city of Amsterdam estimates that residents cruising for parking daily accounts for 50,000 km, which is approximately 18 million km a year (Gemeente Amsterdam, 2013).

Van Ommeren et al (2012) found that cruising might negatively affect other motorists since it may slow down overall traffic. In North America, evidence suggests that on average 30% of urban traffic is cruising for a parking spot and the average cruise time is 8 minutes (Shoup, 2007). While average-searching time does not differ much among different locations within the same town, it does increase sharply when on-street parking becomes free (Shoup, 2005).

Several studies conducted in different cities in North America during several years estimate that between 8% and 74% of traffic flows in urban areas is cruising for parking (Shoup, 2005). The author suggests also that solo drivers are more likely to “search for under-priced curb parking because they cannot split the cost of off-street parking with any passengers” (Shoup, 2005; p. 362). In an experiment in California, he found out that the average occupancy rate of vehicles parked at the curb was 1.3 and of vehicles parked in off-street facilities was 1.7. This suggests that under-priced parking fees tend to allocate scarce urban space (parking) to solo drivers allowing fewer people to visit the city centre.

New technology applied to parking can help drivers to reduce search traffic. For example in the city of Pittsburgh (USA) a technology-based smart parking system pilot project that provides real-time information to the users has proved to be effective (Fabusuyi et al, 2013). A survey among the users reported that 57.2% of drivers needed less time to find a parking space; the magnitude of the reduction varied from 1 to more than 6 minutes less search time. The authors estimate the pilot to have saved 5,746 hours of cruising valued at $117,460 and 2,873 gal gas valued at $10,056.

The SF park pilot project in San Francisco has produced similar results (SFMTA, 2014). The system involve an area where all on-street parking bays are equipped with sensors. These sensors allow the local authority to collect detailed data on parking management and use. Some of the data are used to give real time information to drivers on occupancy rates and fees (that vary according to the occupancy rate). Detailed data collection and analysis show that parking availability has improved dramatically with the target occupancy rate (60-80%) increased by 31%; cruising for parking has reduced by 43%, with 30% fewer vehicle miles travelled and GHG emissions. Transit speed increased where double parking was reduced and, most important, net parking revenue increased slightly while the average hourly fee rate decreased (SFMTA, 2014).

8.3.3 Reduction in car commuting

Parking policies can have a strong influence on the modal split of commuters, especially when parking management is applied at company sites. Very often, a parking space at the workplace is the crucial factor for employees to use their car for commuting. Surveys in different French and Swiss cities (P&P, 2015) show that employees who have a guaranteed parking space at their working place use their car more than those without a guaranteed space. In Switzerland 81% of employees with a guaranteed parking space drive to work against a 35% of those without a guaranteed parking space. In a survey among employees in three French cities it was found that more than 90% of employees that have a guaranteed parking space use the car to commute; this percentage is halved when employees don’t have a guaranteed parking space.

Parking cash-out policies – i.e. giving commuters the choice between free parking or its equivalent cash value to stimulate alternative modes of travel – proved to be very effective in
reducing the percentage of commuters travelling by car (Shoup, 2005). The author found evidence for modal split reduction in commuting by car between 5% and 24% in eight case studies in California. Additionally this kind of schemes produce also net economic benefits for employers. Indeed the cost of parking cash out policies is about 2.5% of the capital savings on required parking. As suggested by the author “if the cost of capital is above 2.5% a year, parking cash out thus saves more than it costs” (Shoup, 2005; p. 265).

When local authority apply similar policies, the results can also be quite effective. Nottingham City Council is the first local authority in Europe to have introduced a Workplace Parking Levy (WPL). Employers with more than 10 staff are required to pay the City Council £288GBP (around 350 Euros) per year for each space in use. Many employers pass the charge on to their staff, which then influences travel behaviour (Mingardo et al, 2015). Though there is not yet hard evidence of the effects of the WPL, local authority estimates it to reduce traffic growth in Nottingham from 15% to 8% by 2021 (Hallam and Gooding, 2013).

8.3.4 Park and Ride
In the last two decades, Park and Ride schemes have been implemented in several urban areas in Europe. P&R facilities are usually located at the edge of urban areas and are intended to stop motorists before they enter the inner city. P&R has attracted considerable attention in the scientific literature in the last decade, among others by Merriman (1995), Parkhurst (2000; 2002), Meek et al (2009; 2010 and 2011) and Mingardo (2013). Most of them suggest that this kind of parking facility might also have some negative effects, namely abstraction from public transport (i.e. drivers that would have taken the public transport if the P&R was not available) and extra trip generation. The first vary between 6% in the UK and 45% in Switzerland (Parkhurst, 2000; Guillaume-Gentil et al, 2006).

8.3.5 Effects on the local economy
One of the most delicate issues when it comes to parking policy is the (possible) effect on the urban economy, namely the retail sector. Very often the retail sector has the credo of “no parking, no business” suggesting that parking and car drivers are fundamental for the functioning of the shops in the urban area. Actually, there is no evidence that the most successful shopping centres are those with the most, or the cheapest, parking. On the contrary, effective parking management can actually increase the attractiveness of the city centre, leading to more visitors (P&P, 2015).

In a survey of 1,000 shoppers in Vienna Teller (2008) found that the most important factors for them in choosing where to shop were the mix of shops, and the atmosphere. Parking availability had no significant impact on where people chose to shop. Similar results have been found in the Netherlands: in a large telephone survey (approx. 70,000 people) about people’s shopping behaviour it was found that the most important reasons to choose a shopping area were proximity to home, completeness of shops and completeness of products (Mingardo, 2012).

In the UK, Sustrans (2006) carried out research at two shopping centres in Bristol. Over 40% of all customers travelled less than 800m to the two centers and only 22% came by car – though retailers thought the figure was around 44%. Similar research in Edinburgh City Centre (City of Edinburgh Council, 2006) found around 20% of shoppers travelling by car, whilst retailers thought it was 40%.

8.4 Lessons for Successful Deployment of this measure
As is stated above, parking has an important advantage compared to other policies in terms
of transferability and upscaling, namely the fact that some form of parking management is applied in most cities and towns. This makes the social and political acceptability of parking easier than for example the introduction of a congestion scheme or perhaps an environmental zone. Despite differences in socio-demographics characteristics and in the economic base, most cities follow the same pattern in terms of development of parking policy (Mingardo et al, 2015). This is important in terms of deployment, and transferability of interventions as cities can learn from each other.

The extent of the evidence collected in the papers and reports that have been analysed for this measure review give confidence that the findings are transferable to other cities. With the exception of the Workplace Parking Levy (WPL) case, where specific legislation is needed, all other measures and project could be transfer to any European city. Parking policy is almost in every EU country a local matter; cities are able to set up their own policy with almost no interfere from national governments. Exceptions to this are Spain and Poland, where the national government can set the maximum parking fee for on-street parking (Mingardo et al, 2015). However, national governments can play a vital role in educating local policy makers and planners as to the important relationship between parking and traffic and sustainable modes.

A common problem when it comes to the implementation of parking policy is awareness and communication, both from a societal and a political point of view. Especially restrictive parking measures – such as an increase in parking fee and/or reduction in parking capacity – might encounter resistance from some stakeholders. Policy makers must be able to communicate the aim and the effects of parking policy properly to the different stakeholders. For example shop owners are usually against any form of restrictive parking measure but the evidence collected in different cities suggest that they should not be afraid of but, on the contrary, should welcome parking management.

Parking management is a fundamental part of any SUMP (Sustainable Urban Mobility Plan). The (scientific) literature is unanimous in the importance of parking for managing transport demand in urban areas. Virtually any car trip ends up in a parking space; accordingly, the correct management of parking has a strong influence on car traffic and the decision-making process by travellers.

Finally, the evidence of the reports and papers that have been reviewed suggest that evaluation and monitoring of parking policies is essential to ensure ongoing success of the measure. Thanks to data collection and analysis, important pilots can be done and policies implemented. For example, technological improvement (i.e. smart parking systems) can be achieved because the evaluation of the project show the positive results for the city.

### 8.5 Additional benefits

As well as the evidence of economic and financial benefits of interventions discussed above, there are a number of additional benefits that are claimed for Parking management interventions:

- **Improved access:** Greater number of people able to access the area being actively managed. Evidence from North America suggests also that solo drivers are more likely to search for cheaper kerb parking because they cannot share the cost of off-street parking with passengers. Therefore, under-priced parking fees tend to allocate scarce urban space (parking) to solo drivers, which may mean that fewer people can visit the city centre.
• **Environmental benefits:** By reducing the time people spend 'cruising' for a parking space, the efficient management of parking brings wider benefits such as improved air quality, reduced casualties, and an improved street environment.

### 8.6 Summary

This measure review has analysed the evidence in 25 reports and papers concerning different aspects of parking. We are confident to say that parking policy is an essential element of a SUMP. Parking management can effectively managed car travel demand both at [company] sites and in the urban area. This review produces important evidence on the effects of parking measure on reduction for cruising and car use in commuting. Additionally, it shows that (restrictive) parking policy measures have no detrimental effect on the local economy. It also points out the possible problems related to the use of Park and Ride facilities.

In the future, thanks to new IT applications in parking (i.e. sensors, automatic number plate recognition and GSM payments) more evidence can be obtained on the exact effects of parking policy. We recommend policy makers to use the data produced by parking management systems – every single transaction involving paid parking is registered somewhere! - in order to produce better monitoring reports. These can be used to increase further the societal and political acceptance of parking measures.

### 8.7 References for this Review

7. Hallam, N. and Gooding, J. (2013), Workplace Parking Levy in Nottingham encourages employers to improve staff travel planning, case study on ELTIS, available online at www.eltis.org
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